Document Type:	EA Administrative Record
Index Field:	Final Environmental Document
Project Name:	Purchase of Additional CT Capacity
Project Number:	2006-122

FINAL ENVIRONMENTAL ASSESSMENT

GENERIC ENVIRONMENTAL ASSESSMENT FOR THE PURCHASE OF ADDITIONAL COMBUSTION TURBINE CAPACITY

TENNESSEE VALLEY AUTHORITY

SEPTEMBER 2006

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The Proposed Decision and Need

The Tennessee Valley Authority (TVA) is proposing to purchase and operate existing combustion turbine (CT) or combined-cycle combustion turbine (CC-CT) plants located in or near the Tennessee Valley. These are plants that have already been constructed and are now being sold by current owners. Some of the plants may be operating, may have been operated in the recent past, or may have been mothballed for some interim period of time.

The demand for total electrical power in the TVA power service area has been growing and continues to grow at a rate of about 600 megawatts (MW) (more than 2 percent) per year since the mid-1990s. Recent total peak demand for electricity in the TVA region has exceeded more than 32,000 MW. Additionally, reliability standards recently submitted to the Federal Energy Regulatory Commission by the North American Electric Reliability Council (NERC) in compliance with the *Energy Policy Act of 2005* have required power companies to activate sufficient reserves to meet NERC's Disturbance Control Standard (DCS). Under this standard, recovery from loss of generation that is equal to or greater than 80 percent of the largest generator must be achieved within 15 minutes. NERC now requires firm capacity for Disturbance Control Standard (DCS) recovery events and no longer allows market purchases to be included as DCS recovery assets. As a result of the load growth and the recently filed NERC standards, TVA needs to procure up to 1,500 MW of peaking capacity and another 1,500 to 2,000 MW of intermediate capacity in the near term. The market for sale or purchase of generating assets of this type typically fluctuates dramatically, requiring expeditious financial decision-making.

In its Energy Vision 2020 Integrated Resource Plan Final Environmental Impact Statement (EIS), TVA (1995) identified and analyzed the environmental impacts of alternative methods for meeting the anticipated increasing demand for electricity in the TVA region between the years 1995 and 2020. Following this environmental review, TVA adopted a portfolio of actions that could be implemented to meet demand growth. CTs and CC-CTs were among the generating methods selected for possible implementation. This review tiers from the Energy Vision 2020 EIS.

As a federal agency, before making a decision to undertake an action with physical environmental impacts, TVA must complete an environmental review of the proposed action under the National Environmental Policy Act (NEPA). The environmental review helps TVA incorporate environmental considerations into its decision-making process. Potential impacts to the environment may be avoided or minimized through this review process. The review also helps to ensure that the proposed projects meet all applicable federal, state, and local environmental laws and regulations.

Under NEPA regulations, there can be three levels of environmental review for TVA's activities, based on the nature of the proposed action and its potential environmental effects. Categorical Exclusions (CEs) are groups of actions that under normal circumstances do not have significant effects, either individually or cumulatively, on the environment and for which neither an Environmental Assessment (EA) nor an EIS is required. Section 5.2 of TVA NEPA Procedures lists 28 CEs. The environmental review of a number of the excluded activities is documented using a Categorical Exclusion Checklist (CEC). This checklist for a CE may identify a potentially significant impact on an environmentally sensitive resource that could elevate the NEPA review to EA or EIS level. Those actions that do not qualify as CEs are reviewed and documented at the EA level to determine whether an EIS is necessary or a Finding of No Significant Impact can be reached. Those major actions with significant environmental impacts are reviewed at the EIS level and documented accordingly.

Section 5.3.5 of TVA's NEPA Procedures (Generic EAs) allows TVA to prepare generic EAs for any category of actions not listed in Section 5.2 as a CE. Such a generic assessment allows TVA to streamline its review process, reduce the costs and administrative burden of completing reviews, shorten the environmental review period, ensure environmental protection, and comply with NEPA and other federal regulations. Projects that lend themselves to a generic assessment are repetitive actions that normally do not have significant effects on the environment and that have been assessed by TVA in the past through preparation of individual environmental reviews. These prior individual reviews inform TVA of the generic nature of the assessments, prompting the agency to prepare a generic EA in the interest of efficiency.

Having assessed the impact of individual CT/CC-CT projects implemented in the past, TVA has determined that this group of actions (namely the purchase and operation of existing CT/CC-CT plants) lend themselves to a generic assessment. Accordingly, the purpose of this EA is to document, on a generic basis, the potential environmental impacts associated with the purchase and operation of existing CT/CC-CT facilities to add additional peaking and intermediate MW capacity. This EA is intended to serve as documentation that the class of actions involving the purchase and operation of existing CT/CC-CT plants qualifies as a CE under Section 5.2.28 of TVA NEPA Procedures. While the objective is to expedite the review process and to conserve agency resources, this EA would also help a reviewer decide if a proposed action fits within a class of actions listed in this EA. Project managers must continue to be alert to circumstances in which normally excluded actions may have potentially significant environmental effects on sensitive resources. Therefore, a proposed action under CE 5.2.28 requires a threshold analysis to determine that no extraordinary circumstances apply, which would require further environmental analysis. If there are no extraordinary circumstances, a CEC is completed to verify the use of CE 5.2.28.

Background

CT/CC-CT Characteristics

TVA and other utilities are investigating the use of CT/CC-CTs to address growing demand and to meet new NERC standards. Growing demand for electricity in the United States has absorbed surplus generating capacity in many regions in the country and is causing an increase in demand for new generating capacity to avoid system failures and price spikes. Due to improvements in technology and deregulation of much of the gas and electric markets, utility and nonutility generators alike are installing CT/CC-CTs as a cost-effective method to incrementally meet their growing needs for peaking capacity. Power suppliers typically order CTs by choosing among the standard models offered by the four principal manufacturers, wait several months or even years for the order to be delivered, and then install these units on sites for which they have received all necessary regulatory approvals and permits (RUS 2000).

CTs are internal combustion engines that operate with a rotary rather than reciprocating motion. CTs are used in a broad scope of applications including electric power generators and in various process industries. Electric utilities use CTs mostly as peaking units for meeting power demand peaks on a daily or seasonal basis. Individual units range in size from 15 MW to over 200 MW, with an average size of 45 MW. Owing to their modular nature, CTs can be installed in a single unit or a group of units either at the same time or over time. This ability to install increments of generation more closely matching immediate needs is one of their most attractive features.

Another desirable characteristic of CTs is that they are generally much cleaner than traditional generating sources. The primary fuel is natural gas; distillate (No. 2) fuel oil is normally used only as a backup fuel. Also, by design, CTs do not run continuously, but rather, are cycled on and off as power requirements vary. The life span of a CT is measured in the number of such on and off cycles. When cycled on, CTs produce fewer emissions than continuously running fossil fuel alternatives such as coal and oil.

A CT consists of three major components: compressor, combustor, and power turbine. Ambient air is drawn in and compressed up to 30-times ambient pressure and directed to the combustor section where fuel is introduced, ignited, and burned. Hot combustion gases are diluted with additional air from the compressor section and directed to the turbine section at temperatures up to 2,350°F. Energy from the hot, expanding exhaust gases is then recovered in the form of shaft horsepower, of which more than 50 percent is needed to drive the internal compressor and the balance of recovered shaft energy is available to drive the external load unit.

The heat content of the gases exiting the turbine can either be discarded without heat recovery (simple-cycle) or used with or without supplementary firing to raise steam for a steam turbine (combined-cycle). The combined-cycle plants are configured with heat recovery steam generators. Steam is produced in the heat recovery system, which drives a steam generator to produce electricity.

Simple-cycle CTs are the least expensive generating plants to install. They are available in standard sizes that can closely match capacity requirements as single units. Multiple units of the same or similar size can be grouped to meet larger capacity requirements or added later as capacity requirements evolve. Because most of the components are assembled as modules, on-site installation time is minimal. Due to the relatively small size of the individual units and lack of extensive support facilities, simple-cycle units are relatively easy to site. The footprint of an actual three-unit (434 MW total capacity) project is only 24 acres. The other components to be installed on the site include: step-up transformers, demineralized water tanks, raw water and fuel oil tanks, a water neutralization storage basin, and a transmission substation.

The primary criteria for siting CTs are proximity to a major gas pipeline, adequate transmission facilities, and roads/railroad for access and delivery of materials. Water requirements normally can be supplied from either a groundwater source or from a municipal/rural water system. Combined-cycle units will require water for making steam and cooling water; this water can come from groundwater or surface water. When sited near adequate transmission facilities, CTs can support the transmission system instead of requiring extensive transmission construction to move the generated power to load centers.

Because simple-cycle units are capable of rapid starts, from cold to full load in approximately 11 minutes, they have become the primary worldwide source for peaking capacity. By their engineering and economic characteristics, peaking units are designed to be cycled on and off with the ebbs and flows of peak electricity demand. Thus, they necessarily run less frequently than intermediate units and consequently produce fewer emissions (RUS 2000).

CC-CTs are not designed as peaking units and are better suited for intermediate loads. These types of units take at least an hour to start. They use the waste heat from the simple cycle operation to generate steam in a heat recovery steam generator, which turns a steam turbine. CC-CTs are more energy efficient and economical to run than CTs by themselves. CC-CTs need access to larger amounts of water, and this typically means water intake structures in nearby bodies of water. Water discharge structures, possibly with cooling towers to lower water temperatures, are also components of CC-CT plants.

Construction of baseload units or Greenfield CT units was not evaluated in this EA because TVA's proposed action is to acquire existing, already constructed plants to meet the need for additional peaking and intermediate capacity in the near term.

Generic EA Decision Framework

The following table is provided as guidance for the application of this generic EA to proposals to purchase specific CC/CC-CT plants. NEPA applies to proposed federal actions that would result in additional physical impacts to the environment. An action that merely continues the environmental status quo is not subject to NEPA. Acquiring and continuing to operate an existing, operating CC/CC-CT plant would be the latter kind of action, and a NEPA review is not required to acquire this kind of plant. Regardless, the analyses contained in this EA would also apply equally to the operational effects of such plants. Existing CC/CC-CT plants that are being considered for purchase should be placed in one of the following classes.

Table 1. Applicability of Generic Environmental Assessment to Proposals to Purchase Combustion Turbines

Class	Plant Characteristics	NEPA Status
1	The plant is currently operating or has operated within the last two years, and necessary environmental permits to operate the plant remain effective.	NEPA does not apply
2	The plant has been mothballed for longer than two years and/or necessary environmental permits to operate the plant have been allowed to lapse. However, the plant has not been permanently shut down, and operation in the future is expected. Indicia suggesting this include, but are not limited to, (1) statements of the current owners that shutdown is not permanent, (2) continued maintenance of equipment, (3) minimal cost to bring the plant back into operation, and (4) minimal time is needed to restart the plant.	NEPA does not apply
3	The plant does not fall within Class 1 or 2.	NEPA applies

This Generic EA will apply to almost all of the plants that may fall within Class 3. If a specific plant has unusual operating characteristics or unusual impacts on sensitive resources, additional environmental review should be conducted before acquiring and operating such a plant.

Alternatives and Comparison

This EA assesses the impact of purchase and operation of existing CT/CC-CT plants and the No Action Alternative. These are the plants that fall within Class 3, described above. The No Action Alternative does not meet TVA's need for additional peaking and intermediate capacity and is, therefore, not considered reasonable. If the No Action Alternative is selected with respect to the purchase of a specific plant, associated environmental impacts are likely to be the same as the Action Alternative, TVA purchasing and operating the plant. The need to add more peaking and intermediate capacity is widespread and affects other utilities. The demand for existing CT/CC-CT plants is such that if TVA does not purchase and operate a specific plant, some other utility or entity is likely to do so. Considering the additional environmental restrictions that apply to activities of federal agencies such as TVA (e.g., NEPA, consultation under the Endangered Species Act, the National Historic Preservation Act, and floodplain and wetlands protection executive orders), the impact of TVA acquiring and operating an existing plant is likely to be less than if a private entity did so.

The different types of CTs that might be purchased for operation under the Action Alternative include simple-cycle single fuel, simple-cycle dual fuel, or combined-cycle dual fuel. All three types of CTs would likely have similar air impacts, assuming similarity in the fuel used. However, a CC-CT would likely be noisier because of the use of cooling towers. Similarly, CC-CTs would have a slightly greater impact on water quality as a result of the discharge of heat.

Affected Environment and Environmental Consequences

This EA addresses the anticipated impacts associated with the purchase and operation of CT/CC-CT plants that have already been constructed. Based on previous environmental reviews, the only impact areas of interest are air, water, and noise.

Impacts Evaluated

No major energy resource can be put in place without complying with a substantial number of federal, state, and local environmental requirements. These regulatory processes typically have multiple opportunities for public comment and participation. Most federal environmental laws allow citizens to bring suit to enforce compliance with requirements. Also, various federal, state, and local environmental regulatory agencies exist to police compliance. Although these environmental laws and their implementing regulations do not eliminate all risks of environmental impacts, they substantially reduce those risks, especially the risk of significant impacts. Consequently, the risk of significant impacts associated with the implementation of the proposed action is substantially lessened because of the existence of these environmental regulations.

Unlike custom-built generating resources, CTs are "off-the-shelf" products that are essentially identical in the details of acquisition, installation, and operation at any given power rating. These common characteristics lend themselves to a common generic assessment of many of the environmental effects associated with such power plants. These common characteristics and range of sizes also make it easier for power suppliers to match their needs more closely as CT modules can be added incrementally. The environmental effects of the installation of a CT on a particular site can in certain situations be site-specific. The evaluation and resolution of those issues often determine the ultimate siting of the CT. Since TVA's proposal is to acquire existing facilities only, impacts occurring as the result of construction (i.e., the footprint impacts) have already taken place. The impacts that are associated with TVA's action are operational impacts, which would consist mainly of the impacts on air quality, noise, and water quality.

Air Quality

In order to have built and operate a CC/CC-CT plant, a number of different construction and operating permits would have been required pursuant to regulations implementing the Clean Air Act at the federal, state, or local level. If the plant's emissions were sufficiently high, new source review permits and "Title V" operating permits would have been required. If emissions were sufficiently small, other state air pollution control permitting processes would have applied. These various permitting processes would establish limitations on the emission output from the plant at levels that are deemed environmentally acceptable and insignificant.

Table 2 provides an estimate of annual emissions of an approximate 1,000-MW simple-cycle CT site that produces 1,000 gigawatts per year (gWh/yr). These estimates are for a dual-fuel facility and also include emissions from the gas heaters necessary to operate a CT site of this nature. The estimated hazardous air pollutant (HAP) emissions from all sources are included in the appendix of this EA.

Table 2. Estimated Emissions 1,000 MW Simple-Cycle Facility @ 1,000 gWh/yr

Criteria/Non-HAP Pollutants	Combustion Turbines (tons)	Natural Gas Heaters (tons)	Annual Total (tons)
Filterable particulate matter (PM_fil)	37.7	3.54E-03	37.7
Sulfur dioxide (SO_2)	10.9	1.12E-03	10.9
Nitrogen oxides (NO_X)	93.5	2.12E-01	93.7
Carbon monoxide (CO)	286.5	7.18E-02	286.5
Volatile organic compounds (VOC)	12.10	1.02E-02	12.11
Sulfur trioxide (SO_3) as sulfuric acid (H_2SO_4)	0.878		0.878

Note: Actual TVA CT, modeled emissions are based on 90 percent and 10 percent operating hours for natural gas and fuel oil, respectively. This is atypically high for annual fuel oil consumption due to Hurricane Katrina when natural gas supplies were limited. Assumed annual generation at 1,000 gWh.

Based on these emission estimates, which are conservatively high, TVA concludes that operation of CT/CC-CTs equal to or smaller than the size of its Lagoon Creek plant would have an insignificant effect on air quality. The resulting emissions are well below allowable amounts that were determined in the permitting processes for Lagoon Creek to be protective of the National Ambient Air Quality Standards. These are national standards formulated by the U.S. Environmental Protection Agency to protect human health with an adequate margin of safety and the environment.

Prior to operating any plant that it acquires, TVA would ensure that applicable emission control requirements are met.

Noise

Most CT/CC-CT projects are sited in rural areas. Typical ambient noise sources in a rural area include traffic, agricultural equipment, and wind. Acceptable noise levels for residences according to U.S. Department of Housing and Urban Development (HUD) guidelines are 65 decibels (day) and 55 decibels (night). The primary source of noise from CT projects would be the CT unit. A secondary source of noise would be the cooling towers associated with combined-cycle plants. Depending on the size of the site and the number and size of the units, acceptable noise levels could be exceeded at the project boundary. Since most rural areas tend to be sparsely settled, the number of sensitive receptors (nearby residences) exposed to noise caused by facility operation would normally be minimal.

Acoustic shielding is the primary method of minimizing noise from the operation of CT components. A typical two-unit (200 MW) plant would be able to meet the above daylight guidelines at a distance of 400 feet from the plant buildings and the nighttime sound level guideline at a distance of 900 feet from the plant buildings. This assumes that the intervening topography is flat and there are no other sound-absorbing objects such as trees. Locating plant facilities within a larger site often creates a sufficient buffer between the noise source and the nearest receptor. In addition, peaking units normally do not operate after 10:00 p.m. (RUS 2000), minimizing the potential to cause disruptive impacts. Prior to initiating operation of any acquired CT/CC-CT plant, TVA would ensure that noise does not exceed the HUD guidelines. This would be done by increasing or adding acoustic shielding or establishing other noise barriers, such as trees or earthen berms, as necessary. This would ensure that any noise impacts from plant operation are not disruptive and are insignificant.

Water

Typical water impacts of a CT/CC-CT could include discharge temperature associated with cooling water, storm water runoff, and impacts associated with fuel and chemical storage. Combined-cycle units require make-up water for steam generation and cooling water and typically have National Pollutant Discharge Elimination System (NPDES) permits issued by the states. Cooling water discharge temperature limits are included in NPDES permits and are designed to protect aquatic life and water quality. Simple-cycle CTs typically do not require water for operation because their cooling systems are usually glycol based.

Storm water permits are also issued for these facilities. Typical storm water parameters for CT/CC-CT sites are pH, solids, and oil and grease from paved surfaces. Site-specific NPDES storm water permits would identify such areas, set limits and practices, such as best management practices, and establish a monitoring program to minimize any adverse impacts and hold impacts to insignificant levels.

Dual-fuel CTs would require on-site storage of liquid fuel and would require groundwater protection and Spill Prevention Control and Countermeasures Plans (SPCCP). These plans would identify potential sources for spills, associated with fuel, glycol, or other chemicals or fuel stored on site, and would specify appropriate containment and prevention measures to avoid and/or minimize potential impacts.

TVA would ensure that these permit-type safeguards are in place and are adequate before operating any plant that it purchases.

Cumulative Impacts

Potential cumulative impacts could be associated with air and water. Noise impacts are not cumulative in nature; an area that is already experiencing high noise levels actually would be less disrupted by another noise source than an area not experiencing such impacts. The air and water permit processes take into account potential cumulative impacts. The conditions established by emissions and discharges from a plant ensure that resulting impacts are environmentally acceptable even when added to the cumulated impact baseline. These permitting processes would also ensure that the existing plant's emissions and discharges are taken into account when any new facilities with emissions or discharges impacting the same air or watersheds are proposed.

Preferred Alternative

TVA is looking to better manage power supply needs, prudently hedge its exposure to power market risks, and meet the recently filed NERC standards. Technological advances during the 1990s produced significant improvements in the economic and operational efficiencies of CT/CC-CT plants and reduced the environmental impacts associated with their operation. TVA's Energy Vision 2020 EIS process identified CT/CC-CT plants as acceptable generation options. The environmental footprint of operating a CT/CC-CT plant is very small, and applicable environmental permitting processes further ensure that operational effects would be insignificant. Accordingly, TVA's preferred alternative is to purchase existing CT/CC-CT plants in order to meet its peaking and intermediate capacity needs.

Summary of Environmental Commitments

- If a specific plant has unusual operating characteristics or unusual impacts on sensitive resources, additional environmental review should be conducted before acquiring and operating such a plant.

- Prior to operating any plant that it acquires, TVA will ensure that applicable emission control requirements are met.

- TVA will ensure that the following permit-type safeguards are in place (if required) and are adequate before operating any plant that it purchases: NPDES, Storm Water, and SPCCP.

- TVA will ensure that noise does not exceed the HUD guidelines.

TVA Preparers and Area of Involvement

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References

Energy Policy Act of 2005. HR 6, Section 1211, Title XII-Electricity Subtitle A-J.

North American Electric Reliability Council. <http://www.nerc.com/about/ero.html> Accessed on September 11, 2006.

Rural Utilities Service. 2000. Programmatic Environmental Assessment for *Front End Financing for Combustion Turbines Purchased by Generation & Transmission Borrowers and Interpretation of 7 CFR §1794.15.*

Tennessee Valley Authority. 1995. *Energy Vision 2020—An Integrated Resource Plan and Programmatic Environmental Impact Statement*.

———, 2001. *Addition of Electrical Generation Baseload Capacity in Franklin County, Tennessee Environmental Impact Statement*.

Appendix

Typical Hazardous Air Pollutants From 1,000-MW Simple-Cycle Facility @ 1,000 gWh/yr Annual Operation of Combustion Turbines

Trace-Element HAP	Combustion Turbines (tons)	Natural Gas Heaters (tons)	Annual total (tons)
Antimony (Sb)	2.41E-03	3.42E-07	2.41E-03
Arsenic (As)	1.92E-03	3.73E-07	1.92E-03
Barium (Ba)	2.17E-02	8.20E-06	2.17E-02
Beryllium (Be)	7.20E-05	2.24E-08	7.20E-05
Cadmium (Cd)	5.30E-04	2.05E-06	5.32E-04
Hydrogen Chloride (HCl)	2.11E-02		2.11E-02
Chromium (Cr)	6.35E-03	2.61E-06	6.35E-03
Cobalt (Co)	1.03E-03	1.57E-07	1.03E-03
Copper (Cu)	4.25E-03	1.58E-06	4.25E-03
Hydrogen Fluoride (HF)			
Lead (Pb)	2.99E-03	9.32E-07	2.99E-03
Manganese (Mn)	8.89E-03	7.08E-07	8.89E-03
Mercury (Hg)	8.57E-05	4.84E-07	8.62E-05
Molybdenum (Mo)	6.68E-03	2.05E-06	6.68E-03
Nickel (Ni)	1.25E-02	3.91E-06	1.25E-02
Selenium (Se)	1.80E-03	4.47E-08	1.80E-03
Silver (Ag)			
Thallium (Tl)			
Vanadium (V)	9.46E-03	4.29E-06	9.47E-03
Zinc (Zn)	1.45E-01	5.40E-05	1.45E-01
Organic HAP (CAS Number)			
1,1-Dichloroethane (75343)			
1,2-Dibromoethane (106934)			
1,2,4-Trichlorobenzene (120821)			
1,3-Butadiene (106990)	3.28E-03		3.28E-03
1,3-Dichloropropene (542756)			
1,4-Dichlorobenzene (106467)			
2-Butanone (78933)			
2,4-Dinitrophenol (51285)			
2,4-Dinitrotoluene (121142)			
3-Chloropropylene (107051)			
4-Methyl-2-pentanone (108101)			
4-Methylphenol (106445)			
4-Nitrophenol (100027)			
Acetaldehyde (75070)	2.04E-01		2.04E-01
Acetophenone (98862)			
Acrolein (107028)	3.26E-02		3.26E-02
Benzene (71432)	6.48E-02	3.91E-06	6.48E-02
Benzyl chloride (100447)			

Trace-Element HAP	Combustion Turbines (tons)	Natural Gas Heaters (tons)	Annual total (tons)
Biphenyl (92524)			
bis(2-Ethylhexyl)phthalate (117817)			
Bromomethane (74839)			
Carbon disulfide (75150)			
Chlorobenzene (108907)			
Chloroethane (75003)			
Chloroform (67663)			
Chloromethane (74873)			
Dibenzofuran (132649)			
Dibutylphthalate (84742)			
Dichlorobenzene (25321-22-6)		2.24E-06	2.24E-06
Dimethylphthalate (131113)			
Ethyl benzene (100414)	1.63E-01		1.63E-01
Formaldehyde (50000)	7.06E-01	1.40E-04	7.07E-01
n-Hexane (110543)		8.01E-07	8.01E-07
Hexachlorobenzene (118741)			
Iodomethane (74884)			
Isophorone (78591)			
Methyl chloroform (71556)			
Methyl methacrylate (80626)			
Methylene chloride (75092)			
Naphthalene (91203)	9.00E-03	1.14E-06	9.00E-03
Pentachlorobenzene (608935)			
Phenol (108952)			
Polychlorinated biphenyl [PCB] (1336363)			
Propionaldehyde (123386)			
Propylene Oxide (75569)	1.48E-01		1.48E-01
Styrene (100425)			
Tetrachloroethylene (127184)			
Toluene (108883)	6.62E-01	6.34E-06	6.62E-01
Vinyl acetate (108054)			
Vinyl chloride (75014)			
Xylenes (1330207)	3.26E-01		3.26E-01
Benzo(g,h,i)perylene (191-24-2)		2.24E-09	2.24E-09
1-Naphthylamine (134-32-7)			
1-Nitropyrene (5522-43-0)			
2-Chloronaphthalene (91-58-7)			
2-Methylnaphthalene (91-57-6)	8.25E-04	4.47E-08	8.25E-04
3-Methylcholanthrene (56-49-5)		3.35E-09	3.35E-09
5-Methylchrysene (3697-24-3)			0.00E+00
7,12-Dimethylbenz(a)anthracene (57-97-6)		2.98E-08	2.98E-08
7H-Dibenzo(c,g)carbazole (194-59-2)			0.00E+00
Acenaphthene (83-32-9)		3.35E-09	3.35E-09
Acenaphthylene (208-96-8)		3.35E-09	3.35E-09
Anthracene (120-12-7)		4.47E-09	4.47E-09
Benzo(a)anthracene (56-55-3)		3.35E-09	3.35E-09

Trace-Element HAP	Combustion Turbines (tons)	Natural Gas Heaters (tons)	Annual total (tons)
Benzo(a)pyrene (50-32-8)		2.24E-09	2.24E-09
Benzo(b)fluoranthene (205-99-2)		3.35E-09	3.35E-09
Benzo(k)fluoranthene (207-08-9)		3.35E-09	3.35E-09
Benzo(b+k)fluoranthene			0.00E+00
Benzofluoranthenes			0.00E+00
Benzo(e)pyrene (50-32-8)			0.00E+00
Benzo(r,s,t)pentaphene (189-55-9)			0.00E+00
Butylbenzylphthalate (85-68-7)			0.00E+00
Chrysene (218-01-9)		3.35E-09	3.35E-09
Dibenzo(a,h)anthracene (53-70-3)		2.24E-09	2.24E-09
Dibenz(a,h)acridine (226-36-8)			0.00E+00
Dibenz(a,j)acridine (224-42-0)			0.00E+00
Dibenzo(a,e)pyrene (192-65-4)			0.00E+00
Dibenzo(a,h)pyrene (189-64-0)			0.00E+00
Fluoranthene (206-44-0)		5.59E-09	5.59E-09
Fluorene (86-73-7)		5.22E-09	5.22E-09
Indeno(1,2,3-c,d)pyrene (193-39-5)		3.35E-09	3.35E-09
Methyl anthracene			0.00E+00
Perylene (198-55-0)			0.00E+00
Phenanthrene (85-01-8)	5.65E-04	3.17E-08	5.65E-04
Pyrene (129-00-0)		9.32E-09	9.32E-09
Polycyclic organic matter (POM)	1.39E-02	1.64E-07	1.39E-02
Polycyclic aromatic compounds (PAC)		6.00E-08	6.00E-08
2,3,7,8-Tetrachlorodibenzo-p-dioxin (1746-01-6)			0.00E+00
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (40321-76-4)			0.00E+00
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (39227-28-6)			0.00E+00
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (57653-85-7)			0.00E+00
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (19408-74-3)			0.00E+00
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (35822-46-9)			0.00E+00
Octachlorodibenzo-p-dioxin (3268-87-9)			0.00E+00
2,3,7,8-Tetrachlorodibenzofuran (51207-31-9)			0.00E+00
1,2,3,7,8-Pentachlorodibenzofuran (57117-41-6)			0.00E+00
2,3,4,7,8-Pentachlorodibenzofuran (57117-31-4)			0.00E+00
1,2,3,4,7,8-Hexachlorodibenzofuran (70648-26-9)			0.00E+00
1,2,3,6,7,8-Hexachlorodibenzofuran (57117-44-9)			0.00E+00
1,2,3,7,8,9-Hexachlorodibenzofuran (72918-21-9)			0.00E+00
2,3,4,6,7,8-Hexachlorodibenzofuran (60851-34-5)			0.00E+00
1,2,3,4,6,7,8-Heptachlorodibenzofuran (67562-39-4)			0.00E+00
1,2,3,4,7,8,9-Heptachlorodibenzofuran (55673-89-7)			0.00E+00
Octachlorodibenzofuran (39001-02-0)			0.00E+00
Dioxin & dioxin-like compds (total mass)			0.00E+00
Dioxin toxic equivalents (TEQ)			0.00E+00
Organic HAP Total	2.33E+00	1.54E-04	2.33E+00
Gaseous HAP Total (without HCl, HF)	2.33E+00	1.55E-04	2.33E+00